Claims

1. A large surface area electrode comprising

a substrate member having current collecting ability and

metallic fiber having a surface,

wherein said metallic fiber is disposed upon said substrate member in a wound manner,

whereby said large surface area electrode has large active surface area is easy to manufacture.

2. The large surface area electrode of claim **1**, wherein said metallic fiber is a metallic fiber tow comprising a multiplicity of fine metallic fibers.

3. The large surface area electrode of claim **2**, wherein said substrate member is essentially a flat piece of sheet metal.

4. The large surface area electrode of claim **3**, wherein at least part of said surface of said metallic fiber tow is covered with an electrocatalytic coating having an outermost surface composition.

5. The large surface area electrode of claim **4**, wherein said metallic fiber tow has a composition selected from the class consisting of titanium and titanium alloys.

6. The large surface area electrode of claim **5**, wherein said outermost surface composition comprises titanium dioxide doped with one or more additive metals selected from the group consisting of niobium in the +4 valence state, tantalum in the +4 valence state, and antimony,

whereby an electrode useful for water purification is produced.

7. The large surface area electrode of claim **5**, wherein said electrocatalytic coating contains at

least one platinum group metal.

8. The large surface area electrode of claim **1**, wherein said metallic fiber comprises one or more fine wires having a surface and having a composition chosen from the class consisting of titanium and titanium alloys, and

at least part of said surface of said fine wires is coated with an electrocatalytic coating containing at least one platinum group metal.

9. The large surface area electrode of claim **2**, wherein said metallic fiber tow is crimped.

whereby an advantageously fluffy electrode structure is provided.

10. The large surface area electrode of claim **2**, further provided with electrical contact enhancement means.

11. The large surface area electrode of claim **10**, wherein said large surface area electrode has edges, and said electrical contact enhancement means comprise edge strips applied to said edges.

12. The large surface area electrode of claim **10**, wherein said electrical contact enhancement means comprise nonconconductive spacers disposed adjacently to said large surface area electrode.

13. The large surface area electrode of claim **2**, further provided with electrical isolation means.

14. The large surface area electrode of claim **13**, wherein said electrical isolation means comprise at least one layer of a nonconductive mesh having a composition and disposed adjacently to said large surface area electrode.

15. The large surface area electrode of claim **14**, wherein said composition of said nonconductive mesh is chosen from the class consisting of polypropylene, polyethylene and vinyl coated fiberglass.

16. The large surface area electrode of claim **3**, wherein said metallic fiber tow comprises essentially a single layer of said metallic fiber tow covering at least a part of said substrate member.

17. A method to produce a large surface area electrode, comprising the step of winding multiple turns of a metallic fiber tow on to a metallic substrate member having a substantially planar geometry.

18. The method of claim **17**, with the precursor step of mechanically crimping said metallic fiber tow prior to winding it on to said metallic substrate member.

19. The method of claim **17**, with the subsequent step of applying an electrocatalytic coating to said large surface area electrode.

20. The method of claim **17**, with the precursor step of applying an electrocatalytic coating to said metallic fiber tow.